

last hundred years that the dogma of compulsory Greek and the value of what is now called a classical education has been promulgated. Previously, Latin was learnt because all the results of the studies of natural philosophers were in that language.

It is evident that Prof. Lankester includes in his study of nature the study of intellectual and emotional man through history, biography, novels, and poetry, but we think that he made a tactical mistake when he neglected to state this clearly. It seems to us that besides the study of nature, the most important thing in a child's education is to make him fond of reading in his own language, for this leads to a future power to make use of books and self-education for the rest of his life. When Prof. Lankester doubts the value of the study of history he is evidently doubting the value of that study as carried on at Oxford, and surely no person who has read the scathing criticism of Prof. Firth will disagree with him. When he speaks of a reform being possible, it may be that he is taking into account a movement of which but little is known outside Oxford itself, the growing indignation of the average undergraduate at being made to pay extravagant sums of money for tuition which is mischievous.

The readers of NATURE are well acquainted with the views put forward in this address. Huxley and many others, dwelling, perhaps, more upon material loss to our Empire, have published them over and over again, but we do not think that anybody has ever presented them with so much grace of style or so much of an endeavour to secure the goodwill of his audience as Prof. Lankester. But, alas! we fear that this fine address will share the fate of many others!

When, thirty-three years ago, Japan began her new career, there were a few people like Ito clever enough to see and say that the study of ancient classics alone, to the neglect of the study of nature, meant ruin to the country; but such ideas would never have been adopted had not Japan been in deadly peril. All the nations of Europe bullied and insulted her, and it was only their mutual jealousies which saved her from complete subjugation. In the presence of that peril the pedants held their peace, and everybody saw the necessity for an immediate, radical reform. In time nature was studied by every child in Japan, and in consequence scientific methods of thinking and acting have permeated the whole nation. All ancient and modern European literature is open to the Japanese who knows English, and English is the one language other than Japanese which every cultured man must know. In the matter of self-protection, anyone can see the result. Because the Japanese have studied nature their scientific officers and men have marched or sailed to victory in every engagement; their statesmen will do exactly what is best for Japan in the negotiations for peace; their country will quietly take its place as one of the first-class Powers of the world, and every person who knows anything about Japan is quite sure that ambitious, wrong-headed schemes of conquest are altogether impossible to the scientific minds of the Japanese.

If Japan had not been in great danger we know that she would not have taken to nature-study, and some of us think that it may need a state of danger in England to produce the necessary desire for reform. The South African muddle was worried through, and almost everybody seems to think that all such muddles may also be worried through, but some of us think that we may not always be so lucky. Danger is close enough even now, and we can only hope that if it becomes great it may grow slowly enough to let us learn something from the object lesson which is being

given us day by day in the news from Russia and the Far East.

Fain would we hope that Oxford will pay attention to what has been said by one whom some of us regard as her cleverest son; but, alas! we have no such hope. Oh, Shade of Clough, how can we help saying that "the struggle nought availeth" when your own best admirers seem unable to think for themselves?

JOHN PERRY.

### A LIFE'S WORK IN THE THEORY OF EVOLUTION.<sup>1</sup>

IN this elaborate and carefully written treatise the veteran biologist of Freiburg has brought together and presented in connected form the fruit of his life-long investigation of the principles and methods of organic evolution. It would be an easy matter to show—indeed, the author admits as much with perfect candour—that his present standpoint differs in many important respects from that adopted by him at former periods of his career. The fact that Weismann has more than once shifted his ground has often been brought against him as a kind of reproach—we think with scant justice; for in a subject like the present, where new facts come crowding upon us almost daily, it is unreasonable to expect that a far-reaching theory should at once attain finality. If the author of such a theory should be willing to recognise that some parts of it become untenable and others require modification in the light of fresh discoveries, this should be reckoned to his credit rather than otherwise. The practice of putting forward ill-considered and hasty views deserves severe condemnation; but it is characteristic of our author that even his boldest speculations rest for the most part on a basis of observed fact, and that he has always honestly striven to render his theory consistent both with itself and also with the new facts that have from time to time come under the observation of other investigators. Moreover, his plan of, so to speak, taking the scientific world into his confidence, and enabling his colleagues to follow the workings of his own mind, has not only added greatly to the interest of his contribution to the biological thought of our time, but has acted also as a powerful stimulus to fellow-workers in the same field. So much may fairly be said, whether his final conclusions meet with general acceptance or the reverse.

The first eleven chapters of the present book traverse familiar ground. Starting with a brief historical account of evolutionary theory up to and including the work of Darwin and Wallace, they proceed to a more detailed discussion of such branches of the subject as the coloration of animals, mimicry, instinct, symbiosis, protective adaptations in plants, the origin of flowers, and sexual selection. These are well-worn topics, but their treatment is interesting and by no means trite. Next comes a discussion of Roux's suggestion of the "Kampf der Theile" which strikes us as somewhat of an excrescence on the general structure of the treatise. The existence of a metabolic response to functional stimulus is undeniable, but we do not think that either Roux or Weismann has plumbed the matter to the bottom, and the latter author's use of the term "selection" in this connection appears to involve some overstrain of language.

<sup>1</sup> "Vorträge über Deszendenztheorie gehalten an der Universität zu Freiburg im Breisgau." By Prof. August Weismann. Second revised edition. 2 vols. Pp. xii + 340; vi + 344. (Jena: Gustav Fischer, 1904.) Price 10 marks.

"The Evolution Theory." By Prof. August Weismann. Translated with the author's co-operation by Prof. J. Arthur Thomson and Margaret R. Thomson. 2 vols. Pp. xvi + 416; iv + 405; illustrated. (London: Edward Arnold, 1904.) Price 32s. net

Chapters on reproduction and the process of fertilisation in both unicellular and multicellular organisms lead us on to a copious exposition of the author's theory of the germ-plasm and its constitution, with the building up of the assumed ultimate vital units or "biophors" into the successive complexes of "determinants," "ids," and "idants." After a discussion of the facts brought to light by the labours of the "Entwicklungsmechanik" school, and a fairly full notice of recent work on regeneration in its relation to the germ-plasm hypothesis, we come to what is in many respects the strongest part of the book, the refutation, namely, of the Lamarckian view of the transmissibility of functional modifications. Here Weismann has always been at his best, and to him undoubtedly belongs the credit of having awakened and sustained so fresh and vigorous a body of opinion in reference to this point as virtually to have created one of the most important epochs in the history of evolutionary doctrine. The two next chapters deal with the author's hypothesis of "germinal selection," as to which it may be sufficient to remark that, however ingenious and interesting the theory may be as an attempt to explain the chief phenomena of variation, it is as yet far from having reached the stage of verification. In the succeeding chapters, which deal with inbreeding, parthenogenesis, and reproduction, both sexual and asexual, it is interesting to observe that Weismann has considerably modified his standpoint with reference to amphimixis, his present view approximating in some degree to that advanced several years ago by Haeckel. This section is preceded by a discussion of the "biogenetic law" of Haeckel, and is followed up by chapters on the influence of the environment and of isolation in the formation of the specific type, together with the various causes of extinction.

The book concludes with some theoretical considerations on the subject of spontaneous generation, and a final vindication of the principle of selection, the dominance of which principle over all the categories of vital units may be taken as the key-note of the entire treatise.

It will be seen that the ground covered by this work is very extensive. Though most of the topics dealt with are considered by the author chiefly or solely with an eye to his theory, his treatment never lacks interest, and the result is worthy of his high reputation. There are some points as to which we should have welcomed a more thorough discussion, and others on which we confess to remaining unconvinced for reasons *quas nunc perscribere longum est*; but it would be ungrateful not to acknowledge to the full the immense services rendered to biological science by the stimulating labours in the domain both of theory and practice of which this book is a monument.

The illustrations are for the most part excellent. Of the two here reproduced, the first serves to illustrate the basis of one of the chief arguments brought forward by Weismann, as also by Strasburger and O. Hertwig, in favour of regarding the nuclear chromatin as the true hereditary substance, viz. the numerical equality of the chromosomes and the disparity in amount of the cell-protoplasm in the generative products of the two sexes. The second (from Fischer) supplies evidence of the possibility of

certain external conditions, in this case temperature, influencing the germ-plasm even while contained within the body of the parent.

We have little space left for detailed criticism, but must point out that by some unaccountable oversight the letterpress of plates i. and ii. contains several serious errors—patent at once to the trained entomologist, but calculated to mislead the general reader. These mistakes appear uncorrected in the English translation, where also, as if to make confusion worse confounded, "die folgende Art" (plate ii., Fig. 20) is rendered "the foregoing species." Fortunately, however, the lapses in question are not of

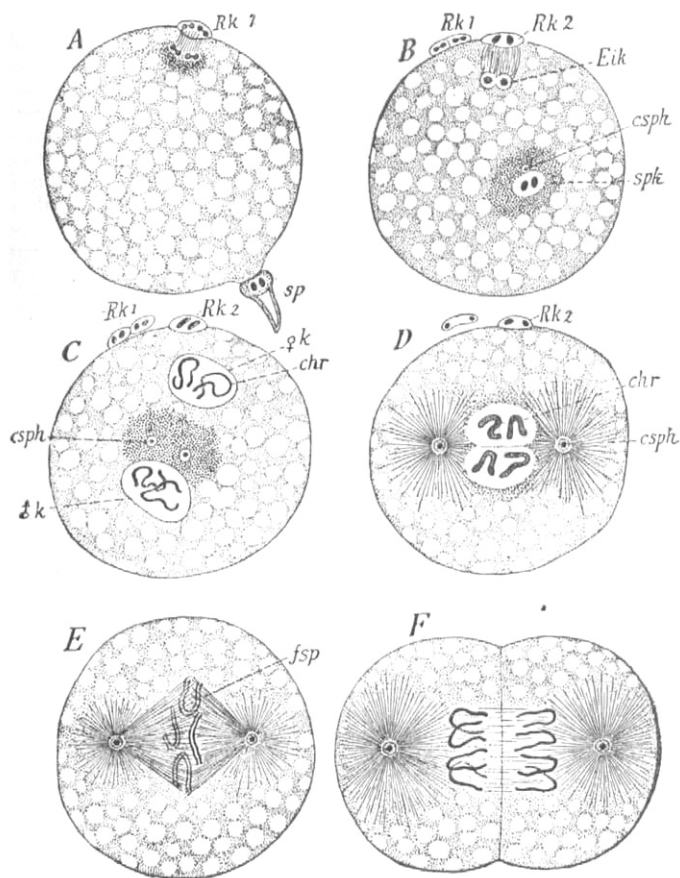


FIG. 1.—Process of fertilisation in *Ascaris megalocephala*. *Rk 1*, *Rk 2*, first and second polar body; *sp*, spermatozoon with two chromosomes, a protrusion of the egg-protoplasm is meeting it; *Eik*, reduced nucleus of the ovum; *spk*, nucleus of spermatozoon; *δ k*, *♀ k*, sperm nucleus and ovum nucleus, each with two chromosomes (*chr*); only the male nucleus has a centrosphere (*csph*), which in *C* has already divided into two; *fsh*, segmentation spindle. From Weismann's "Evolution Theory." Translated by Prof. and Mrs. Thomson.

a nature to impair the value of the argument which the figures are meant to illustrate.

Other slips in the translation are plainly due to the fact that the translators are unfamiliar with portions of the subject-matter, as in vol. ii., p. 348, where the point of the argument is blunted by the rendering of "Nachtfalter" as "butterfly"; such imperfections, though they should be remedied in a new edition, are of little real importance. More serious is a mistranslation, or perhaps a misprint (vol. i., p. 290) by which the words of the original, "in welchem die eigentliche Chromatinsubstanz nur in vielfacher Zertheilung enthalten ist," are perverted into a statement which is almost grotesquely incorrect.

Again, on p. 304 of the same volume, an entirely wrong meaning is given to a sentence by the failure of the translators to make it clear that "wenn es nothwendig wäre" must refer, not to "fertilisation," but to the "limitation of polar divisions." On p. 136 (vol. ii.) the sense of the original is obscured by the inadequate rendering of "dann" as the enclitic "then." *Chaerocampa* (for *Choerocampa*) is found in the original; the translators, however, are responsible for "Coenogenesis."

But in spite of these and other blemishes of a like nature, the translators are to be congratulated on having performed their difficult task with skill and success, the result being a work which, in its English

soon have been placed at its head; but in 1882 he resolved to retire on the pension which he had well earned, and to establish himself in London. Among the great services which he rendered to science during his stay in India, perhaps the most important was the preparation, in concert with his colleague, H. B. Medlicott, of a "Manual of the Geology of India." This invaluable treatise gave for the first time a succinct general view of the geological structure and history of the whole country. It has taken its place as one of the classic text-books of the science.

While attached to the Indian Survey, Dr. Blanford's proved ability led to his being employed in several missions or expeditions. Thus when, in 1867, preparations were made in India for the dispatch of an armed force against Theodore of Abyssinia, he was selected as geologist to accompany the Army. The wisdom of this selection was well proved by the excellent volume in which he gave the results of his observations during the march to Magdala and the return to the coast. Again, in 1872, he accompanied the Persian Boundary Commission, and his notes of this journey were embodied in another valuable book.

During his travels in India and beyond it, Dr. Blanford did not confine himself to the study of the rocks, but always kept a keen eye on the wild animals of each region. His published journals showed him to be as capable a zoologist as he was a geologist. Indeed, during the later years of his life his main scientific work lay amidst the fauna of British India, in regard to which his published memoirs were recognised as the chief authority on the subject. His wide experience as a traveller over the surface of the earth likewise enlisted his sympathies with geographical exploration, and made him a valued member of the council of the Royal Geographical Society.

In his writings there is often a suggestiveness or prescience that shows how keen was his insight, how far-reaching his grasp of scientific problems, more especially of those in which questions of zoology and geology were intermingled. Some of his papers in which he unfolded his views on these subjects are well deserving of attentive study. His address to the geological section of the British Association at the Montreal meeting in 1884, and his presidential discourses to the Geological Society in 1889 and 1890, may be cited as examples of his characteristic manner of treatment.

Dr. Blanford's high qualities as a man of science were fully recognised by his contemporaries. He was early elected into several of our leading scientific societies, and was chosen as a member of their councils. He received the Wollaston medal of the Geological Society and a Royal medal of the Royal Society. A few years ago, in recognition of his services to Indian science, he was made a Companion of the Order of the Indian Empire. Up to the end he continued to interest himself in the affairs of the societies with which he was connected. For years he had been treasurer of the Geological Society, and he attended the council meetings to within a few weeks before his death. His colleagues at the council board then saw with regret that his health was obviously failing, but they did not anticipate that they were never again to see his familiar face among them. A few weeks ago he was asked by the council of the Royal Society to write for them an obituary notice of his old friend and colleague, Medlicott, who had recently died. He complied with this request, and it proved to be his last piece of work. The printed proofs of his manuscript were sent to him, but before they could reach him he had become too ill to look at them. After a short illness he passed away on the morning of Friday, June 23,

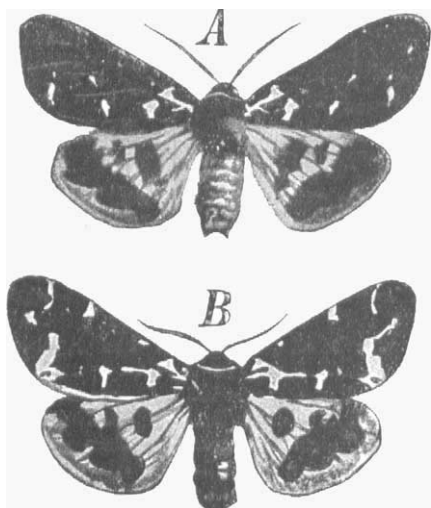


FIG. 2.—A, an aberration of *Arctia caja*, produced by low temperature. B, the member of its progeny most divergent from the normal. B, though reared at the ordinary temperature, is aberrant in the same direction as its parent. After E. Fischer. From Weismann's "Evolution Theory." Translated by Prof. and Mrs. Thomson.

no less than in its German dress, will be read with extreme interest and with the greatest sympathy and respect for its indefatigable author. F. A. D.

#### DR. WILLIAM THOMAS BLANFORD, F.R.S.

THE tidings of Dr. Blanford's death will be received with sorrow among men of science all over the world. His many-sided accomplishments had given him a notable place among geologists, geographers, palæontologists, and zoologists, and his gentle, kindly, unassuming nature had gained him an abiding place in the affectionate regard of all who came to be associated with him. Born on October 7, 1832, in London, he early developed a taste for scientific pursuits, and was accordingly sent to the Royal School of Mines, Jermyn Street, where he distinguished himself as a student, under De la Beche, Playfair, Edward Forbes, Ramsay, Smyth, and Percy. From London he passed to the famous mining academy at Freiberg. Having thus obtained an excellent training, he was, in 1855, appointed to the Geological Survey of India under its founder, Thomas Oldham. For some twenty-seven years he continued to devote his energies to Indian geology, making wide acquaintance with the rocks and scenery of the great Dependency, and enriching the publications of the Survey with maps and descriptive memoirs. Had he chosen to remain longer in the service, he would

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